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ABSTRACT

This investigation focused on sex and ethnic differences in mathematics achievement among and between black and Mexican-American adolescents. One hundred twelve subjects were chosen: the selection included 61 blacks and 51 Mexican-Americans. The sample included 42 males and 70 females. All pupils attended the same school, with most from homes low on the socio-economic scale. The instrumentation used resulted in the collection of the following data types: (1) scores of achievement: (2) mother influence: (3) father influence: (4) math as a male domain: (5) usefulness of mathematics: (6) attitude toward mathematics: and (7) teacher influence. Three null hypotheses were posed. Analysis of the data revealed that males achieved higher than females, although females had a more positive attitude towards mathematics. Also, Mexican-Americans achieved significantly higher than blacks, but blacks were more positive in their attitudes. It appears that ethnic background exerts a much greater influence on mathematics achievement than sex. It is felt that ethnic differences should play a more prominent role in future studies of differences in mathematics achievement. (MP)

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Sex and Ethnic Differences in Mathematics Achievement of Black and Mexican-American Adolescents.

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Sex and Ethnic Differences in Mathematics Achievement
of Black and Mexican-American Adolescents.

PURPOSE AND CONCEPTUAL FRAMEWORK

Most research regarding sex differences in mathematics achievement has been done using primarily white, middle class subjects. As an example studies reported by Fennema and Sherman (1978), Sherman (1977), Boswell & Katz (1980), and Fox, Tobin and Brody (1979) used subjects who were almost totally white middle-class. No significant studies involving sex and ethnic differences have been reported by other authors.

In a study concerning sex and ethnic differences in mathematics achievement reported by Creswell and Houston (1980), it was found that the primary source of variance was ethnicity (significant at $p<.01$) while sex was not a significant source. The study involved anglo, chicano and black adolescents. Additionally it was found that anglo females outperformed anglo males at both the eighth and eleventh grade levels, while black and chicano males outperformed females at each grade level. In another study (Creswell, 1980) involving white, middle class high school adolescent high schievers in mathematics, the females outperformed the males.

Clearly there exists a need to study sex and ethnic differences in mathematics achievement, particularly among and between black and Mexican-American adolescents. The present study addressed this need.

PROCEDURES

Description of the Population

One hundred twelve black and Mexican-American male and female adolescents were selected and included forty-two males and seventy females. Sixty-one were black and fifty-one were Mexican-American attending the same school and

most were from homes which were primarily low on the socio-economic scale.

Collection of Data

Scores of achievement in mathematics were obtained from the Iowa Test of Basic Skills which was administered to each student. The Fennema-Sherman scales perporting to measure Mother/Father influence, Math as a Male Domain, and Mathematics Usefulness were administered along with a scale to measure Teacher Influence which was designed by the author. Each of these scales contained twelve response items to which a subject responded as either strongly agree, agree, undecided, disagree or strongly disagree. Each scale was scored by a Likert-type sliding scale from one to five. Additionally a twenty-item mathematics attitude scale was administered which contained ten positive and ten negative statements to which the subjects responded as indicated above. All scales were administered over a two day period.

The instrumentation resulted in the collection of the following data: scores of achievement, Mother Influence, Father Influence, Math as a Male Domain, Usefulness of Mathematics, Attitude toward Mathematics, and Teacher Influence.

Research Design and Data Analysis

In order to assess the significance of the data, the following null hypotheses were posed: H_o1: There is no significant correlation between a linear combination of predictors of achievement in mathematics that accounts for the variance in achievement. H_o2: Male adolescents are indistinguishable from female adolescents in terms of attitude toward mathematics, achievement in mathematics, feeling of Father/Mother and Teacher influence, feeling that mathematics is a male domain, and feeling of the usefulness of mathematics. H_o3: Black and Mexican-American adolescents are indistinguishable in terms of achievement in and attitude toward mathematics, feeling of Mother/Father and Teacher influence, feeling that mathematics is a male domain, and feeling

of the usefulness of mathematics.

H_o1 was analyzed using stepwise multiple regression analysis along with an F test of significance. H_o2 and H_o3 were analyzed using discriminant analysis. Significance was determined by Wilke's Lambda using Rao's method of relating Wilke's Lambda to the random variable F.

RESULTS AND CONCLUSIONS

The evaluation of H_o1 revealed that the full regression equation accounted for 47% of the variance, a significance of $p<.01$. In examining the independent variables separately, sex contributed only 2% of the variance and was not a significant contributor; ethnicity contributed almost 12% and was significant at $p<.01$, usefulness of mathematics contributed almost 15% of the variance and was significant at $p<.01$. The only other variable which contributed significantly was father influence which contributed almost 5% and was significant at $p<.01$.

The evaluation of H_o2 revealed that males and females are very much distinguishable in terms of the variables, at $p<.0004$. Indeed, the variables predicted male group membership for 30 of the 42 males or 71.4%, and predicted female group membership for 51 of 70 females or 72.9%. The variables which contributed most to the prediction were attitude and teacher influence, each at $p<.05$, with male domain at $p<.001$.

The evaluation of H_o3 revealed that blacks are very much distinguishable from Mexican-Americans in terms of the variables at $p<.00001$. The variables predicted black group membership for 44 of 61 blacks or 72.1%. Mexican-American group membership was predicted for 37 of 51 subjects, or 72.5%. Interestingly, the variables which contributed significantly to the prediction were achievement at $p<.00001$, and mother influence at $p<.001$.

Additionally, it was found that males achieved higher than females, although

females manifested a more positive attitude toward mathematics than did males. Also, Mexican-Americans achieved significantly higher in mathematics than did blacks although attitudes of blacks were more positive than were Mexican-American attitudes.

Since there is only one study with which the results can be compared, it is not possible to formulate generalizable conclusions. Suffice it to say that ethnic background appears to exert a much greater influence on mathematics achievement than does sex. This coincides with results reported by Creswell & Houston (1980).

Additionally, the present study indicates that usefulness of mathematics and father influence are significant contributors to the variance in mathematics achievement, although the Creswell and Houston (1980) study reported that only male domain and mother influence were significant contributors.

Although the present study involved only 112 subjects, it is felt that the results indicate that ethnic differences should play a more prominent role in future studies of differences in mathematics achievement. Further study in this area should involve biological and perhaps cognitive factors.

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